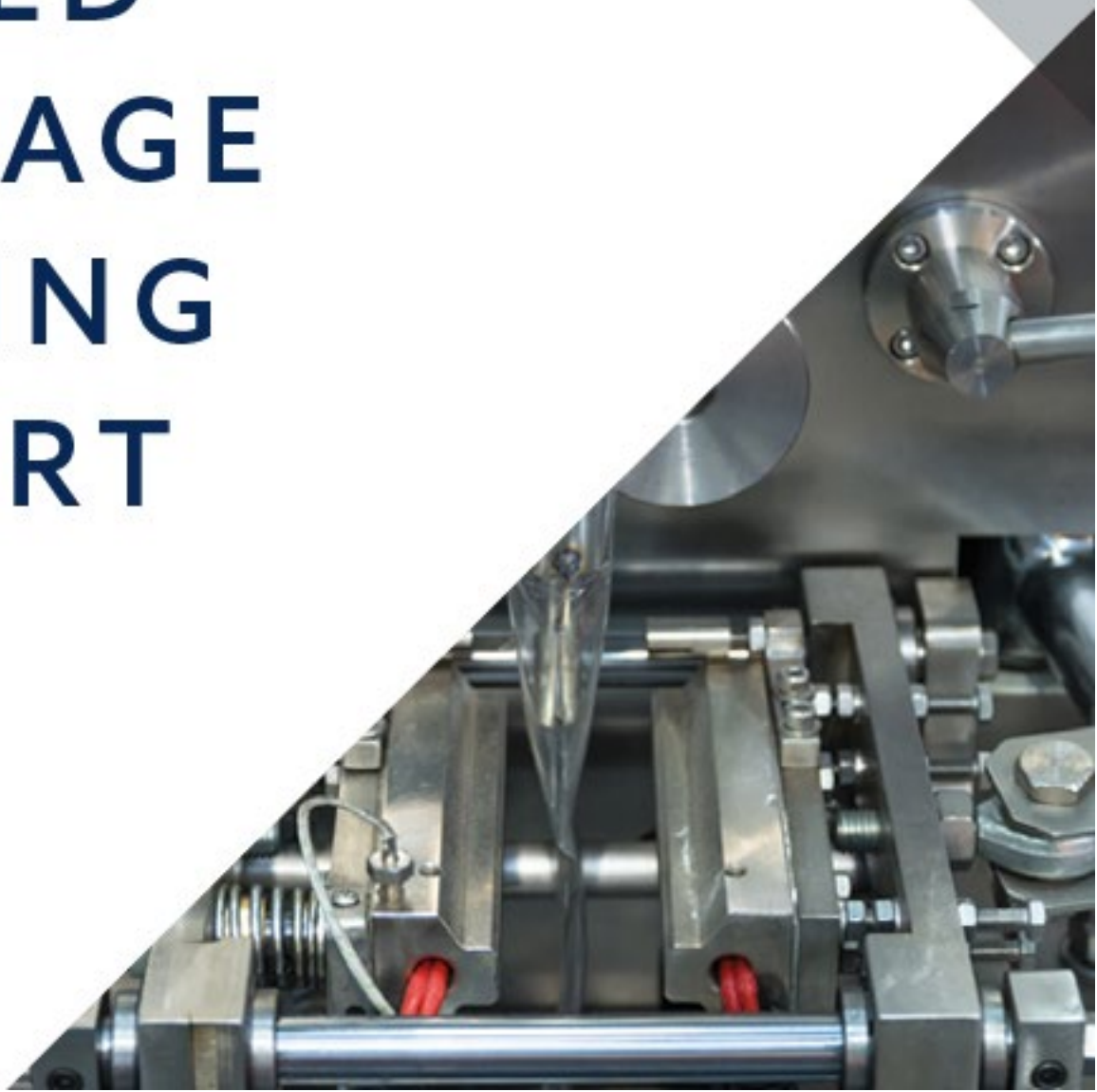
PROMACH

LAKO™

SEAL STRENGTH AND SEALED PACKAGE TESTING REPORT



F&T

FLEXIBLES & TRAYS

Contents

Project Details 2
Supplied Materials 3
Comments: 3
Scope of Work 4
Results 5
Summary of Results 5
Recommendations 5
Ultimate Seal Strength Profile Tests 6
Machine Settings: 6
Hot Tack Test Comments: 6
Hot Tack Profile Test 7
Machine Settings: 7
Hot Tack Test Comments: 7
End Seal Settings 8
Vacuum Decay Results 8
Test Packages 8
Sample Packs 8
Sealed Package Testing Summary 8

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

Project Summary

Project Details

Date	January 1, 2026
Customer Name (Customer Number)	Customer Name (Customer Number)
Address	123 Main St, Springfield OH, 12345
Contact	Customer Contact Info
Customer PO	PO 123456789
Lako Technician	Technician Name
Lako Contact	+1 (419) 662-5256 7400 Ponderosa Rd, Perrysburg, OH 43552
Project Number / Job Number	FT-26-XX / 12345
Estimate Number / Order Number	12345 / 12345

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

Project Summary (continued)

Supplied Materials

Material	Description	Details
Roll	Hand rolled coated paper	Film Thickness: 0.0048”-0.0055” [0.122 – 0.140 mm]

Supplied Pouches - Front

Corrugation Example

Comments:

The seals on the supplied pouches of product had some minor distortions usually associated with sealing at high temperature relative to the seal temperature range for the film.

The film has the feel and appearance of a high-quality film that should seal easily.

Overall, the packages provided seemed to be formed with few defects out of a high-quality film.

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client’s facility and can be expected to account for some variation in the results achieved at LAKO.

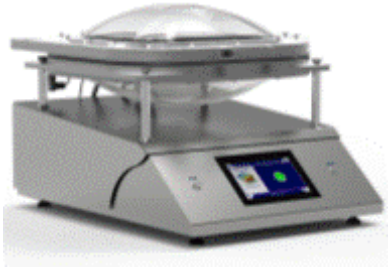
Project Summary (continued)

Scope of Work

The supplied film is to be tested for hot tack and ultimate seal strength to determine the ideal temperature to use when producing the sealed packages for the Seal Tooth Profile testing. Each of the selected seal tooth profiles will then be used to create packages using the dwell time and temperature as determined using the supplied parameters and seal strength test results.

Test Step	Test Procedure Performed
Ultimate Seal Strength Profile	ASTM F88
Hot-Tack Seal Strength Profile	ASTM F1921
Sealed Package Vacuum Decay	Based on ASTM F2338

Equipment used:

		
TMI – Hot-Tack Tester and Seal Tester SL-10 75-50	Technopack – MS-405 Impulse Sealer	Inficon – Contura S400

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

Results

Summary of Results

Seal testing was performed to find the temperature range with the highest Hot Tack strength and Ultimate Seal Strength. The Ultimate Seal Strength consistently increased with the increasing temperature, while the Hot Tack Strength was highest between 265° F [129.4° C] and 295° F [146.1° C].

Packages were then made for vacuum testing using 220 msec dwell time, 1 inch seal width, 50 psi seal pressure, a selection of seal profiles, and the range of temperatures determined to have the best seal strength. This testing measures leak rates, with the target leak rate of less than 0.050 mbar·L/s per Lako standards.

Most of the tested packages had a leak rate around 1 mbar·L/s, and none of them were below the target leak rate. The results did not conclusively indicate that the leak rate was significantly impacted by seal temperature.

Recommendations

Lako's recommendation for this film is to use a moderately aggressive seal profile (such as Lako's H68) and high temperatures and pressures to achieve the best results.

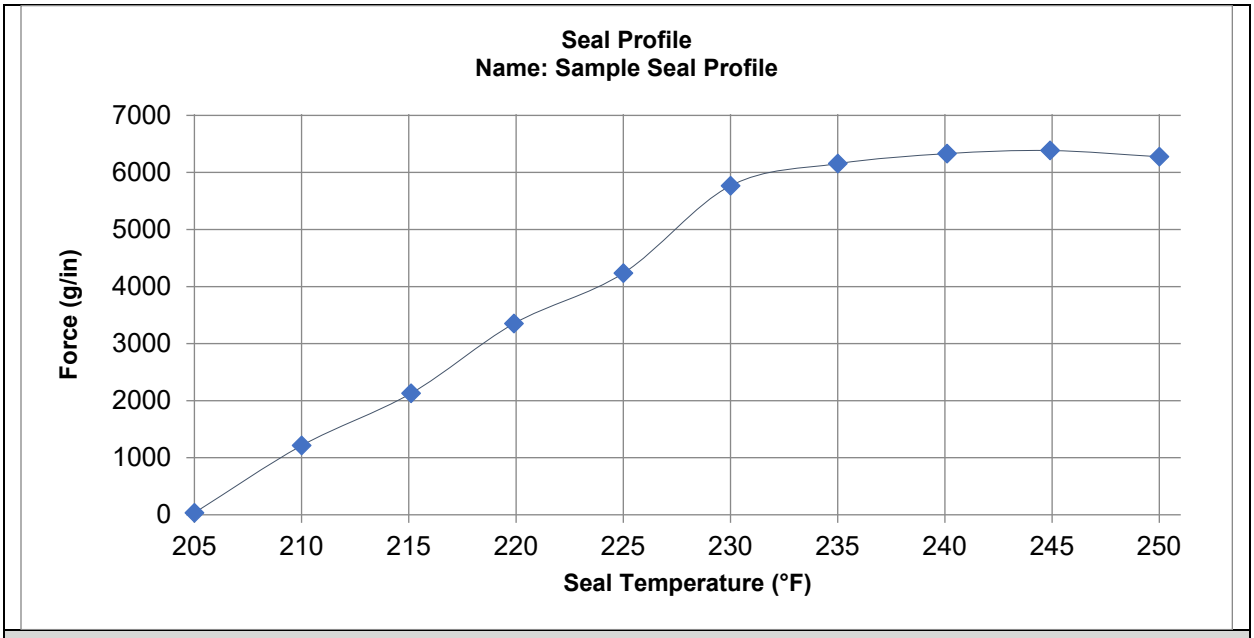
All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

Results (continued)

Ultimate Seal Strength Profile Tests

Machine Settings:

Starting Temp:	205.0° F [96.1° C]	Ending Temp:	250° F [121.1° C]
Temp Interval:	5.0° F [2.78° C]		
Seal Length:	1.000 in [25.4 mm]	Pressure Request:	100.0 PSI [689.5 kPa]
Seal Width:	0.750 in [19.1 mm]	Jaw Pattern:	Steel Upper/
Dwell Time:	0.50 sec	Peel Velocity:	Poly Lower
Cool Delay:	0.00 sec	Selection Method:	0.25 in/sec



Ultimate Seal Strength Test Results

Hot Tack Test Comments:

The film has a steady increase in seal strength until it reaches the material limit of about 6000 g/in at about 235°F [112.8°C]. At this level the seal strength is limited by the elongation of the material.

Based on the results of the Ultimate Seal Strength Test, the optimal seal temperature range is likely above 235°F [112.8°C].

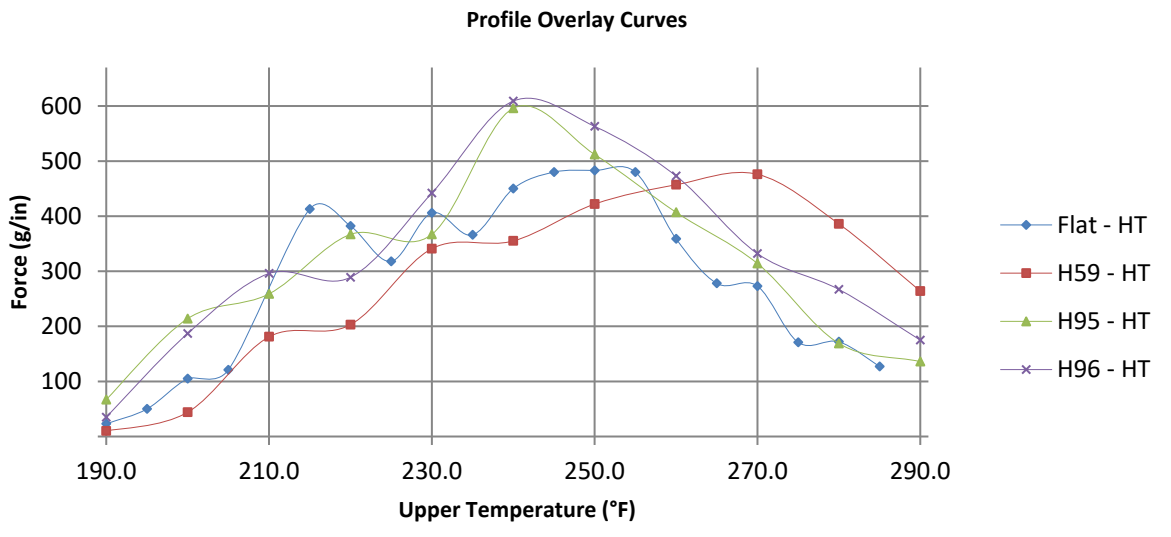
All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

Results (continued)

Hot Tack Profile Test

Machine Settings:

Starting Temp:	190.0° F [87.7° C]	Ending Temp:	290° F [143.3° C]
Temp Interval:	10.0° F [5.56° C]		
Seal Length:	1.000 in [25.4 mm]	Pressure Request:	100.0 PSI [689.5 kPa]
Seal Width:	0.750 in [19.1 mm]	Jaw Pattern:	Varies
Dwell Time:	0.50 sec	Peel Velocity:	0.25 in/sec
Cool Delay:	0.00 sec	Selection Method:	Initial Peek



Hot Tack Test Results

Hot Tack Test Comments:

The coarse-pitch H95 and H96 profiles had better Hot Tack seal initiation at lower temperatures and better peak hot tack temperatures than the flatter tooling setups (the flat and H59 setups). These coarse profiles also had a narrow peak with a sharp dropoff at higher temperatures, where the flatter/finer setups had a broader window, with a slower dropoff at higher temperatures. The variability of the material thickness may have affected the flat setup the most as it had the largest inconsistencies in the Hot Tack Strength increases.

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.

7400 Ponderosa Rd. / Perrysburg, OH 43551
Tel: 419-662-5256 | LakoTool.com | ProMachBuilt.com

Results (continued)

End Seal Settings

Seal Pressure	Dwell Time	WOS	LOS
100 psi	0.5 s	0.25 in [6.35 mm]	7.48 in [190 mm]

Vacuum Decay Results

Test Packages

Profile	Seal Temperature	Leak Rate (mbar·L/s)
H266	230° F [110.0° C]	9.922
	240° F [115.6° C]	0.007
	250° F [121.1° C]	0.004
	260° F [126.7° C]	0.000
	270° F [132.2° C]	0.001
	280° F [137.8° C]	0.000
H270	230° F [110.0° C]	23.945
	240° F [115.6° C]	7.485
	250° F [121.1° C]	0.010
	260° F [126.7° C]	0.000
	270° F [132.2° C]	0.003
	280° F [137.8° C]	0.000

Sample Packs

Supplied Package	Leak Rate (mbar·L/s)
1	0.000
2	0.000
3	0.000

Sealed Package Testing Summary

During sealed package testing, seal profiles H181 and H68 were used along with Film 1 to create packages to be tested for hermetic seals in the Contura S400 and then tested for their ability to withstand pressure in the Pack-Vac tank. During this testing, the H181 was able to achieve a hermetic seal at lower temperatures and pressures than the H68 profile.

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.